

Patent Claims

1. Arrangement for the spectroscopic determination of the components and concentrations of pumpable organic waste, comprising a sample vessel (1), a pump (2), and a measurement cell (3) which form a unit together with a spectroscopic measurement head (4), wherein the measurement cell (3) is connected to the pump (2), which can be regulated to vary the flow rate, and to the sample vessel (1) by a pipe (5), and wherein the spectroscopic measurement head (4) and the regulatable pump (2) have electrical connections to a controlling and evaluating unit.

2. Arrangement according to claim 1, wherein the measurement cell (3) is constructed in such a way that the sample flows between two oppositely located windows which are integrated in the measurement cell (3) perpendicular to the direction of flow.

3. Arrangement according to at least one of claims 1 to 2, wherein a multi-port valve (6) is arranged in the pipe (5) to produce connections to a water vessel and/or cleaning liquid vessel.

4. Arrangement according to at least one of the preceding claims, wherein the multi-port valve (6) arranged in the pipe (5) can produce connections to one or more vessels with test liquids for self-calibration.

5. Arrangement according to at least one of the preceding claims, wherein the multi-port valve (6) has an actuating drive which is connected to the controlling and evaluating unit.

6. Arrangement according to at least one of the preceding claims, wherein a device is provided for drying the measurement cell (3) and is connected to the controlling and evaluating unit.

7. Arrangement according to at least one of the preceding claims, wherein a device is provided for regulating the temperature of the sample and is connected to the controlling and evaluating unit.

8. Arrangement according to at least one of the preceding claims, wherein the arrangement is connected to the outlet line of a vessel arranged on a vehicle by two three-way directional valves (8, 9).

9. Arrangement according to at least one of the preceding claims, wherein the arrangement is mounted in its entirety on a vehicle for dispensing pumpable organic waste, and the through-flow volume of an outlet valve provided in the outlet line of the vessel is regulated by the controlling and evaluating unit.

10. Method for the spectroscopic determination of the components and concentrations of pumpable organic waste, wherein the sample contained in a sample vessel is pumped by a pump (2) through a measurement cell (3) which forms a unit with a spectroscopic measurement head (4), the measurement head (4) carries out a spectroscopic measurement of the sample flowing through the measurement cell using the principle of transflection, and the measurement results are conveyed for further processing to a controlling and evaluating unit which determines components and concentrations of substances contained in the sample based on stored specific calibrations.

11. Method according to claim 11, wherein the pump (2) can be regulated to ensure the flow rate of the sample required for the spectroscopic measurement.

12. Method according to at least one of claims 11 and 12, wherein an existing water vessel is connected to the measurement cell (3) by a multi-port valve (6) in order to remove residues of the measured sample from the measurement cell (3) and prepare the measurement cell (3) for the next sample.

13. Method according to at least one of the preceding claims, wherein an existing water vessel and a vessel with cleaning liquid are connected successively to the measurement cell (3) by a multi-port valve (6) in order to clean out residues of the measured sample from the measurement cell (3), rinse the measurement cell (3), and prepare the measurement cell (3) for the next sample.

14. Method according to at least one of the preceding claims, wherein residual moisture is removed from the measurement cell (3) by a device for drying after the measurement cell (3) has been cleaned.

15. Method according to at least one of the preceding claims, wherein one or more vessels with test liquids for self-calibration of the arrangement can be connected to the measurement cell (3) by a multi-port valve (6).

16. Method according to at least one of the preceding claims, wherein the sample can be temperature-controlled by a device to prevent the influence of temperature on the measurement results.

17. Method according to at least one of the preceding claims, wherein the measurement head (4) carries out a spectroscopic measurement of the measurement cell without a sample in order to determine the degree of contamination of the measurement cell (3).

18. Method according to at least one of the preceding claims, wherein the cleaning and/or drying of the measurement cell (3) and a possible temperature regulation of the sample are/is controlled by the controlling and evaluating unit.

19. Method according to at least one of the preceding claims, in which a sample to be measured is pumped by a pump (2) through a measurement cell (3) which forms a unit with a spectroscopic measurement head (4), the measurement head (4) carries out a spectroscopic measurement of the sample flowing through the measurement cell (3) by transmission and/or reflection, and the measurement results are conveyed for further processing to a controlling and evaluating unit which determines components and concentrations of substances contained in the sample based on stored specific calibrations, wherein the sample to be measured is taken from the outlet line of a vessel arranged on a vehicle by a first three-way directional valve (8) arranged in the pipe (5) and is conveyed back into the outlet line by a second three-way directional valve (9) arranged in the pipe (5) after being measured.

20. Method according to claim 19, wherein an additional control signal is generated by the controlling and evaluating unit based on the determined components and concentrations of substances contained in the sample for regulating the flow through an outlet valve when dispensing pumpable organic waste.

21. Method according to at least one of claims 19 and 20, wherein previously determined soil values and the instantaneous speed of the vehicle are taken into account by the controlling and evaluating unit in addition to the determined components and concentrations of substances contained in the sample in order to generate a control signal for regulating the flow through an outlet valve while dispensing pumpable organic waste.